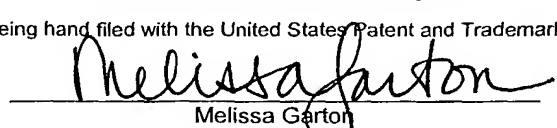


1005 Rec'd PCT/DIO 28 FEB 2002

<small>*FORM PTO-1390 OFFICE 22 (REV 11-2000)</small>		<small>U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK</small>		<small>ATTORNEY'S DOCKET NUMBER</small> <b>449122024800</b>	
<b>TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. § 371</b>				<small>U.S. APPLICATION NO. (If known, see 37 CFR 1.5)</small> <b>10/069794</b> <b>Not yet assigned</b>	
<small>INTERNATIONAL APPLICATION NO.</small> <b>PCT/DE00/02939</b>		<small>INTERNATIONAL FILING DATE</small> <b>August 28, 2000</b>		<small>PRIORITY DATE CLAIMED</small> <b>August 30, 1999</b>	
<small>TITLE OF INVENTION</small> <b>METHOD AND SYSTEM FOR DIVERTING TELECOMMUNICATIONS CONNECTIONS</b>					
<small>APPLICANT(S) FOR DO/EO/US</small> <b>Sigrid HERTELT et al.</b>					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
<div>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371</div> <div>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</div> <div>3. <input type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.</div> <div>4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).</div> <div>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))<div>a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau).</div><div>b. <input checked="" type="checkbox"/> has been communicated by the International Bureau.</div><div>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</div></div> <div>6. <input checked="" type="checkbox"/> An English language translation of the International Application under PCT Article 19 (35 U.S.C. 371(c)(2)).<div>a. <input checked="" type="checkbox"/> is attached hereto.</div><div>b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4).</div></div> <div>7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).<div>a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau).</div><div>b. <input type="checkbox"/> have been communicated by the International Bureau.</div><div>c. <input type="checkbox"/> have not been made, however, the time limit for making such amendments has NOT expired.</div><div>d. <input type="checkbox"/> have not been made and will not be made.</div></div> <div>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</div> <div>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</div> <div>10. <input type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</div>					
<b>Items 11. to 16. below concern document(s) or information included:</b>					
<div>11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</div> <div>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</div> <div>13. <input type="checkbox"/> A FIRST preliminary amendment.</div> <div>14. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</div> <div>15. <input type="checkbox"/> A substitute specification.</div> <div>16. <input type="checkbox"/> A change of power of attorney and/or address letter.</div> <div>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825</div> <div>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4).</div> <div>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</div> <div>20. <input checked="" type="checkbox"/> Other items: 1) Application Data Sheet; 2) IPER; 3) Int'l Search Report; 4) Return receipt postcard.</div>					
<b>CERTIFICATE OF HAND DELIVERY</b>					
I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on February 28, 2002. <div> Melissa Garton</div>					

U.S. APPLICATION NO (if known, see 37 CFR 1.5) Not yet assigned <span style="font-size: 1.5em; margin-left: 100px;">10/069794</span>		INTERNATIONAL APPLICATION NO PCT/DE00/02827		ATTORNEY DOCKET NO 449122023800	
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21. <input checked="" type="checkbox"/> The following fees are submitted: <b>BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO.....\$1,040.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO.....\$890.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....\$740.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provision of PCT Article 33(1)-(4) .....\$710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) .....\$100.00				<b>CALCULATIONS PTO USE ONLY</b>	
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$0	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	- 20 =		x \$18.00	\$0	
Independent claims	- 3 =		x \$84.00	\$0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$280.00	\$0	
TOTAL OF ABOVE CALCULATIONS =				\$890.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$0	
SUBTOTAL =				\$890.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				+	\$0
TOTAL NATIONAL FEE =				\$890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				+	\$0
TOTAL FEES ENCLOSED =				\$890.00	
				Amount to be refunded:	\$
				charged:	\$

a. ☒ Please charge my **Deposit Account No. 03-1952** (referencing Docket No. 449122024800) in the amount of \$890.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

b. ☒ The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment to **Deposit Account No. 03-1952** (referencing Docket No. 449122024800).

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Kevin R. Spivak  
 Morrison & Foerster LLP  
 2000 Pennsylvania Avenue, N.W.  
 Washington, D.C. 20006-1888

SIGNATURE

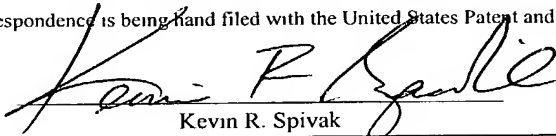
Kevin R. Spivak  
 Registration No. 43,148

February 28, 2002

PATENT  
Docket No. 449122024800

**CERTIFICATE OF HAND DELIVERY**

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on June 24, 2002.

  
Kevin R. Spivak

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:

Sigrid HERTEL et al.

Serial No.: 10/069,794

Filing Date: February 28, 2002

For: METHOD AND SYSTEM FOR  
DIVERTING TELECOMMUNICATIONS  
CONNECTIONS

Examiner: Not yet assigned

Group Art Unit: Not yet assigned

**PRELIMINARY AMENDMENT**

Box PCT  
Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination and calculation of the filing fees, please amend this application  
as follows.

[illegible]

**In the Specification:**

Replace the specification with the attached substitute specification. A marked-up specification is also enclosed.

**In the Claims:**

**In the claims:**

Please amend the claims as follows:

1. (Amended) A method for diverting telecommunications connections for line identifications of a private branch exchange in a public switching office in a information is stored to a telecommunications terminal with reference to the diverted telecommunications connections directed to one of the line identifications, comprising:

providing a prescribed number of line identifications; and

requesting from a telecommunications terminal, participation in the diverting with the allocation of one of the line identifications, wherein the diverting of a telecommunications connection directed to an allocated line identification to the telecommunications terminal is performed in the public switching office.

2. (Amended) The method as claimed in claim 1, wherein the allocated line identification and the identification of the telecommunications terminal are stored in a public switching office of the telecommunications terminal,

transmitted in parallel an information signal that includes data to reproduce a line identification, and

the information signal is modified when setting up a telecommunications connection from the telecommunications terminal to another telecommunications terminal.

3. (Amended) The method as claimed in claim 2, wherein the information signal is modified such that it reproduces the line identification allocated in the course of the diversion.

4. (Amended) The method as claimed in claim 3, wherein the information signal is modified such that it reproduces the line identification of the private branch exchange.

5. (Amended) The method as claimed in claim 2, wherein the modification of the information data can be switched off temporarily by inputting a special control signal.

6. (Amended) The method as claimed in claim 1, wherein the diversion is initiated from the telecommunications terminal by inputting a prescribed access code.

7. (Amended) The method as claimed in claim 1, wherein the telecommunications terminals participating in the diverting are prescribed, and the identifications are stored in the public switching offices of the provided line identifications and/or the private branch exchange.

8. (Amended) The method as claimed in claim 1, wherein a request is made by transmitting a control signal from an arbitrary terminal to which the telecommunications connections are diverted.

9. (Amended) A system for diverting telecommunications connections, comprising:  
a public switching office having a device to store information with reference to a diversion of telecommunications connections directed to one of a plurality of provided line identifications to a telecommunications terminal and to divert telecommunications connections; and

a private branch exchange connected to a plurality of line identifications and to manage the provided line identifications, wherein

the telecommunications connections that are directed to the line identification of the private branch exchange allocated during the request are diverted automatically toward the switching office to the telecommunications terminal.

10. (Amended) The system as claimed in claim 9, further comprising a second switching office connected to the second telecommunications terminal, the second switching office including a device to store the line identification of another telecommunications terminal to which it is diverted, and the line identification is allocated to the second telecommunications terminal modifies information data to reproduce a line identification.

**In the Abstract:**

Please replace the abstract with the new abstract attached hereto.

[illegible]

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned “**Version with markings to show changes made**”.

Dated: June 24, 2002

By: Kevin R. Spivak  
Kevin R. Spivak

**Morrison & Foerster LLP**  
**2000 Pennsylvania Avenue, N.W.**  
**Washington, D.C. 20006-1888**  
**Telephone: (202) 887-6924**  
**Facsimile: (202) 263-8396**

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**In the claims:**

Please amend the claims as follows:

1. (Amended) A method for diverting telecommunications connections for line identifications (A11-A1N) of a private branch exchange (PBX) in a public switching office (VST1) in ~~which~~ a information is stored to ~~which~~ a telecommunications terminal (A2) with reference to the ~~diversions~~ **diverted** telecommunications connections directed to one of the line identifications(A11-A1N), ~~having the steps,~~ **comprising:**

providing a prescribed number of line identifications(A11-A1N); **and**

~~request~~ **requesting** from a telecommunications terminal(A2) ~~to participate,~~  
**participation** in the diverting method with the allocation of one of the line identifications,  
**wherein the diverting**(A11-A1N),

~~characterized in that the diversion~~ of a telecommunications connection directed to an allocated line identification (A11) to the telecommunications terminal (A2) is performed in the public switching office(VST1) ~~itself.~~

2. (Amended) The method as claimed in claim 1, ~~characterized in that~~ **wherein** the allocated line identification (A11) and the identification of the telecommunications terminal (A2) are stored in a public switching office (VST2) of the telecommunications terminal(A2) ~~in advance of the method,~~

transmitted in parallel ~~with the useful signal~~ is an information signal that ~~contains~~  
**includes** data ~~that~~ **to** reproduce a line identification, and

the information signal is modified when setting up a telecommunications connection from the telecommunications terminal (A2) to a ~~further~~ **another** telecommunications terminal(A3).



3. (Amended) The method as claimed in claim 2, ~~characterized in that~~ **wherein** the information signal is modified ~~in such a way~~ that it reproduces the line identification (A11) allocated in the course of the diversion.

4. (Amended) The method as claimed in claim 3, ~~characterized in that~~ **wherein** the information signal is modified ~~in such a way~~ that it reproduces the line identification of the private branch exchange(PBX).

5. (Amended) The method as claimed in ~~one of claims 2 to 4~~, ~~characterized in that~~ **claim 2, wherein** the modification of the information data can be switched off temporarily by inputting a special control signal.

6. (Amended) The method as claimed in ~~one of the preceding claims~~, ~~characterized in that said method~~ **claim 1, wherein the diversion** is initiated from the telecommunications terminal (A2) by inputting a prescribed access code.

7. (Amended) The method as claimed in ~~one of the preceding claims~~, ~~characterized in that~~ **claim 1, wherein** the telecommunications terminals ~~from which it is possible to participate~~ **participating** in the diverting method are prescribed, and ~~their~~ **the** identifications are stored in the public switching offices (VST1) of the provided line identifications (A11-A1N) and/or the private branch exchange(PBX).

8. (Amended) The method as claimed in ~~one of claims 1 to 6~~, ~~characterized in that~~ **claim 1, wherein** a request ~~can be~~ **is** made by transmitting a control signal from an arbitrary terminal (A2) to which the telecommunications connections are diverted.

9. (Amended) A system for diverting telecommunications connections, **having comprising:**

a public switching office (VST1) ~~that has means (L1) for storing~~ **having a device to store** information with reference to a diversion of telecommunications connections directed to one of a plurality of provided line identifications (A11—A1N) to a telecommunications terminal (A2), ~~as well as means for diverting~~ **and to divert** telecommunications connections; and

a private branch exchange (PBX) ~~that is connected to a plurality of line identifications (A11—A1N) provided for the diverting method and manages~~ **and to manage** the provided line identifications(A11—A1N);, **wherein**

~~characterized in that~~ **the** telecommunications connections that are directed to the line identification (A11) of the private branch exchange (PBX) allocated during the request ~~being~~ **are** diverted automatically toward the switching office (VST1) to the telecommunications terminal(A2).

10. (Amended) The system as claimed in claim 9, ~~characterized in that it has~~ **further comprising** a second switching office (VST2) ~~that is connected to the second telecommunications terminal(A2) and includes means (L2) for storing,~~ **the second switching office including a device to store** the line identification of a further **another** telecommunications terminal (A2) to which it is ~~possible to divert~~ **diverted**, and the line identification (A11) ~~is~~ allocated to ~~this~~ **the** second telecommunications terminal (A2), ~~as well as means for modifying~~ **modifies** information data ~~that~~ **to** reproduce a line identification.

METHOD AND SYSTEM FOR DIVERTING TELECOMMUNICATIONS  
CONNECTIONS

ABSTRACT

In the case of a method for diverting telecommunications connections, a prescribed number of line identifications are first made available. Upon request to participate in the diverting method, a line identification that is still free is allocated, all telecommunications connections directed to this line identification subsequently being diverted to a telecommunications terminal.

GR 99 P 2700

- 1 -

Substitute Specification  
(Marked Version)

Description

METHOD AND SYSTEM FOR DIVERTING TELECOMMUNICATIONS  
CONNECTIONS

CLAIM FOR PRIORITY

This application claims priority to International  
Application No. PCT/DE00/02939 which was published in  
the German language on March 8, 2001.

TECHNICAL FIELD OF INVENTION

The present invention relates to a method and a system  
for diverting telecommunications connections.

BACKGROUND OF THE INVENTION

Providers of public telecommunications networks also  
offer a range of supplementary services in addition to  
the usual basic services - which are, as typically  
include a rule, the setting up of telecommunications  
connections and the transmission of useful data for the  
communication. The present invention makes use of the  
service of call deflection that permits a user under  
various conditions to divert incoming connections to  
other terminals, for example to automatic spoken  
announcements, to an operator or to another terminal at  
which the user can temporarily be reached.

"Teleworkers" or "Telecommuters", for example, also  
avail themselves of such call deflection. These are to  
be understood to include staff members of a company  
who, in addition to their company workstation, also  
work from home from time to time and are, in  
particular, to be contactable there by phone. An  
insurance agent is an example of such a teleworker. If  
the latter activates the call deflection, telephone  
calls arriving at his company workstation are deflected  
automatically to his home terminal.

However, insurance agents in particular carry out the majority or even their entire work from home (possibly also only on specific days of the week), and so they use their actual company terminal ~~only~~ seldom ~~or~~ to never. Maintaining a plurality of such terminals that are, in addition, only seldom used constitutes, however, a cost factor not to be neglected.

US 5,905,776 also discloses a system and a method that permits users to make use of one from among a number of different telecommunications stations at different locations, while the apparent location of the user remains fixed. Coordination modules of a private branch exchange (PBX) establish a peer-to-peer communication with station-based coordinate modules in order to permit automatic connection to a terminal at which the individual user is located while he leaves the apparent location of the fixed, specific user terminal of the branch exchange. In this case, the coordination modules are integrated as "line cards" in the private branch exchange (PBX), or connected thereto.

In one embodiment, the compatibility of the terminals enables a user to work from a terminal that is arranged near him at home, while the apparent location of the user for any calling party is a terminal assigned to the user and located in the office.

US 5,889,845 discloses a device and a method for permitting a connected user a virtual presence in a company office and being essentially able to behave as if this user were physically present in the company office.

In one embodiment, a virtual presence server instructs the private branch exchange (PBX) to forward all calls automatically to the connected user. In accordance with this prior art, the connected user handles outgoing telephone calls, fax transmissions, data transmissions and E-mail and implements his Internet access as if





ensure that a connection from another internal terminal of the branch exchange is also correctly diverted to a home terminal, the private branch exchange stores at least the information as to whether a line identification is allocated in the course of the diverting method. If this is the case, calls internal to the branch exchange are automatically forwarded to the public switching office and deflected from there to the home terminal. Furthermore, an exchange of information between the public switching office and the private branch exchange is required to integrate branch exchange terminals in the method according to the invention.

~~It has been possible for~~ For approximately 15 years, for example in the case of ISDN connections ~~but also~~ and of analog connections, it has been possible to find out the calling number of an interlocutor. In the case of ISDN connections, there they are transmitted for ~~this purpose~~ in the D-channel, in parallel with the useful data in the B-channel that are used for the communication, ~~information.~~ Information data that reproduce a line identification ~~and~~ are evaluated and displayed by an appropriately designed telecommunications apparatus. Consequently, if while at work the teleworker calls a customer from his house, it will be possible for the latter to find out the private number of the teleworker. The customer would then be able to call the teleworker at home even in periods when the latter is not even working, and could disturb the latter in his leisure time.

Consequently, when a telecommunications connection is being set up from the second telecommunications terminal (that is to say, for example, from the home terminal of the teleworker) to a third telecommunications terminal (for example the telecommunications terminal of a customer), the information data ~~containing~~ including the line identification data are modified in such a way that, instead of the line identification of the second telecommunications terminal, they produce the first





embodiment, the call deflection can be activated in a simple way from the home workstation, specifically by setting up a telecommunications connection to the public switching office of the line identifications made available, and transmitting a suitable control signal, for example by inputting a special code and/or a PIN number. A line identification that is still free is then automatically allocated. However, it would also be conceivable specifically to request one of the line identifications

and/or also to deal preferably with persons with a higher entitlement status, that is to say, if appropriate, to transmit an already allocated line identification to the newly requesting, but more highly entitled teleworker. The corresponding information is then also transmitted simultaneously to the public switching office of the home terminal. If the company workstation is a component of a private branch exchange, it can be provided that a corresponding control signal is also transmitted to the private branch exchange.

It is frequently desired for the possibility of conducting private conversations from the home terminal still to exist even after the activation of the call deflection. It can therefore be provided that the modification of the information data can be suppressed for this call by dialing a specific code that is recognized by the public switching office of the home workstation. It is thereby possible to distinguish very easily in the public switching office of the home terminal whether a business or a private conversation is in the process of being conducted so that separate bills can be prepared.

It may also be desired for the option to be given to request call deflection from an arbitrary external terminal, and that the first line identification and the second terminal, to which the telecommunications connections are to be diverted, are not established until the request. This then permits, for example, telephone calls to be deflected to an arbitrary

terminal at which a person can be reached temporarily (for example, to a hotel terminal during a business trip). There is also the option of diverting the connections to a cell phone.

In accordance with a further aspect of the invention, ~~the independent claim 11 proposes~~ there is a system with the aid of which such a diverting method can be carried out. The essential components of the system are a plurality of provided line identifications that are managed by a switching office connected to them. This switching office then includes means a device for storing the required information that says whether and to which telecommunications terminal a telecommunications connection directed to one of the provided line identifications is to be diverted. Also provided in the switching office are the means required for diverting telecommunications connections such that ~~said means~~ the device carry out the diversion automatically if necessary.

### BRIEF DESCRIPTION OF THE DRAWINGS

The invention is to be explained in more detail below with the aid of the attached ~~drawing~~, drawings in which:

Figure 1 shows a diagram of the telecommunications terminals and switching offices participating in the method according to the invention.

Figure 2 shows the diversion of telecommunications connections directed to a company line identification to the home workstation.

Figure 3 shows the design of telecommunications connections from the home workstation; ~~and.~~

Figure 4 shows the response of the home terminal in the case of private and of business telephone calls.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS



allocated, the associated information is also stored in a second teleworker list L2 that is a component of the public switching office VST2 of the corresponding home terminal A2.

A call deflection is activated by the teleworker inputting the prescribed access code from his home terminal A2 and subsequently inputting a personal PIN number for his identification. This is recognized by the switching office VST1 of the private branch exchange PBX, and a free line identification (the line identification A1<sub>1</sub> in the present example), is assigned to the home terminal A2, and the information is forwarded to the switching office VST2 of the home terminal A2. The call deflection can also be deactivated again in the same way. There is then the possibility, for example, of detecting the times of logging on and off, and thus also the working time of the teleworker. As already mentioned at the beginning, it can also be provided that some persons are preferably dealt with when requesting the diverting method, and carry out "prioritize login" (for example by inputting a special code). It can then be established that these persons are allocated a line identification in any case, it being possible in the extreme case to allocate an already occupied identification for this purpose.

Figure 2 shows the diversion according to the invention of telecommunications connections directed to the line identification A1<sub>1</sub>. If, for example, a customer dials the number of the line identification A1<sub>1</sub> on his external terminal A3, the connection is firstly set up as far as the public switching office VST1 of the private branch exchange PBX. On the basis of the information stored in the teleworker list L1, however, it is recognized in the public switching office VST1 that the call is to be deflected to the telecommunications terminal A2. The telecommunications connection is then diverted directly from there such

that the lines between the public switching office VST1 and the private branch exchange PBX of the company are not loaded. Furthermore, this diversion is not visible to the telecommunications terminal A3, and so from his point of view the customer is calling the teleworker at a company workstation A1<sub>1</sub>.

If the line identification A1<sub>1</sub> is called from the terminal A4, which is likewise integrated in the private branch exchange PBX, it is normally sufficient in private branch exchanges to dial ~~only~~ an abbreviated direct dial number. Consequently, in order to permit a diversion to the home terminal A2 here, as well, at least the information as to whether a connection directed to the line identification A1<sub>1</sub> is to be diverted or not is stored in the private branch exchange PBX. When a request is made for call deflection, the corresponding information can be transmitted from the switching office VST1 to the private branch exchange PBX by means of QSIG (Q- (Reference Point) Signaling). If a deflection is desired, the connection is simply forwarded to the public switching office. Once again, a telecommunications connection directed to the line identification A1<sub>1</sub> is then recognized in the public switching office VST1 and is then diverted to the home terminal A2 in accordance with the stored information in the teleworker list L1. Here, as well, the deflection is not visible to the caller. Moreover, there also continues to be the possibility, of course, of reaching the teleworker at his home workstation A2 through his usual private number.

~~It can be provided for~~ In the case of a diverted telecommunications connection ~~that,~~ the calling subscriber is thus subject to charges ~~only~~ for setting up the connection as far as the public switching office VST1, whereas the remainder of the communications link is charged to the teleworker (or the company thereof). It would is also be ~~conceivable~~ possible to select from

the terminal A3 a line identification - for example, the identification  $Al_N$  - that is a "virtual" terminal which is, however, not even allocated at this instant. In this case, this connection can be forwarded to a mailbox M, to a general company terminal or to the central terminal of the private branch exchange PBX.

Figure 3 illustrates the setting up of telecommunications connections originating from the home terminal A2 of the teleworker. If the latter dials the number of the terminal A3 (for example of a customer), the telecommunications connection is set up in a known way via the public switching office VST2 of the home terminal A2 and the telecommunications network N to the external terminal A3. In addition, however, on the basis of the information stored in the teleworker list L2 of the public switching office VST2, the information data transmitted in parallel is now modified. If the customer at the terminal A3 is capable of identifying the interlocuter on the basis of the information data, it is not the number of the home terminal A2, but the number of the line identification  $Al_1$  obtained when the request was made that appears in his display. From the point of view of the terminal A3, it is the company terminal with the identification  $Al_1$  that is the origin of the telecommunications connection. This prevents the customer from finding out the private number of the teleworker and possibly calling up the latter during his leisure time. Since, however, a teleworker can be allocated various line identifications in the case of repeated requests, it can be established alternatively that the modified information data display ~~only~~ the general number of the private branch exchange PBX or a central company number but not the concrete identification  $Al_1$ .

If the teleworker would like to call from his home terminal A2 to a colleague at the latter's company workstation A4, it is also sufficient at his home terminal A2 to dial ~~only~~ the direct call number

internal to the branch exchange. This is recognized by the public switching office VST2, and the telecommunications connection is forwarded automatically via the public switching office VST1 to the private branch exchange PBX, and from there to the extension A4.

If the line identifications are made available inside a private branch exchange, it is necessary for exchange of data and information to be possible between the private branch exchange and the public switching office if the call deflection is to be performed as early as there. Consequently, the line identifications  $Al_1$  to  $Al_N$  made available are preferably respectively main lines that can be managed entirely by the public switching office.

~~It can be provided~~ The invention also provides for the teleworker also to be able to conduct private conversations from his home terminal A2 even after requesting call deflection. In this case, he firstly dials a special control code in order to suppress the modification of the information data temporarily for a call, and subsequently dials the desired call number. The private number of the terminal A2 and not the line identification A1<sub>1</sub> then appears at the called terminal.

The response of the home terminal A2 and of the public switching office VST2 are illustrated once again schematically in figure 4. If the call deflection is not activated (up), the terminal A2 responds like a normal private telephone connection with the private subscriber profile TP1. This subscriber profile TP1 reports, for example, under which call number the terminal A2 can be reached, and whether the latter is availing itself of any sorts of additional services (call waiting, mailbox etc).

If the teleworker logs on for call deflection, the terminal A2 additionally receives the teleworker



profile TP2. How the terminal A2 then actually responds depends on the incoming and outgoing telecommunications connections. If the connection that is directed to the line identification A1, but is diverted arrives at the terminal A2, or if the teleworker dials a number after logging on for call deflection, the terminal A2 responds in accordance with the teleworker profile TP2 like the company line identification A1. In the case of incoming connections that come about through dialing of the private number or through inputting of the previously mentioned control code, the terminal A2 responds, however, like the usual residence telephone in accordance with the normal subscriber profile TP1.

In accordance with a first embodiment, the teleworkers are entitled to participate in the diverting method ~~only~~ from their home terminal A2. In this case, the identifications of the authorized home terminals can already be stored in the public switching office VST1 of the private branch exchange. However, it can be provided for reasons of flexibility that also the second terminal to which a telecommunications connection is to be diverted, is not determined until a request is being made. This can be performed, for example, by the teleworker dialing from the terminal to which the connections are to be diverted a special control code for activating the call deflection, subsequently dialing the number of the desired second terminal (which could also, however, possibly be recognized automatically), and dialing a personal PIN number for his identification. Then, for example, ~~only~~ the information as to which persons are entitled to avail themselves of the diverting service would initially be stored in the teleworker list L1. ~~Only~~ during ~~During~~ logon ~~can~~, the information can then be supplemented and a new entry be made to the switching office of the second terminal. It is therefore possible to switch into the system from an arbitrary public terminal. Furthermore, it would then also be possible to deflect the calls to a cell phone (for example a GSM

phone).

Since the method according to the invention can be realized merely by supplementing the switching office technology, independence from the locations of the terminals is achieved. A change in location requires only a new entry in the teleworker lists, that is to say ~~only~~ a low administrative outlay.

METHOD AND SYSTEM FOR DIVERTING TELECOMMUNICATIONS  
CONNECTIONS

CLAIM FOR PRIORITY

This application claims priority to International Application No. PCT/DE00/02939 which was published in the German language on March 8, 2001.

TECHNICAL FIELD OF INVENTION

The present invention relates to a method and a system for diverting telecommunications connections.

BACKGROUND OF THE INVENTION

Providers of public telecommunications networks offer a range of supplementary services in addition to the usual basic services - which typically include a rule, the setting up of telecommunications connections and the transmission of useful data for the communication. The present invention makes use of the service of call deflection that permits a user under various conditions to divert incoming connections to other terminals, for example to automatic spoken announcements, to an operator or to another terminal at which the user can temporarily be reached.

"Teleworkers" or "Telecommuters", for example, also avail themselves of such call deflection. These are to be understood to include staff members of a company who, in addition to their company workstation, also work from home from time to time and are, in particular, to be contactable there by phone. An insurance agent is an example of such a teleworker. If the latter activates the call deflection, telephone calls arriving at his company workstation are deflected automatically to his home terminal.

However, insurance agents in particular carry out the

majority or even their entire work from home (possibly also only on specific days of the week), and so they use their actual company terminal seldom to never. Maintaining a plurality of such terminals that are, in addition, only seldom used constitutes, however, a cost factor not to be neglected.

US 5,905,776 also discloses a system and a method that permits users to make use of one from among a number of different telecommunications stations at different locations, while the apparent location of the user remains fixed. Coordination modules of a private branch exchange (PBX) establish a peer-to-peer communication with station-based coordinate modules in order to permit automatic connection to a terminal at which the individual user is located while he leaves the apparent location of the fixed, specific user terminal of the branch exchange. In this case, the coordination modules are integrated as "line cards" in the private branch exchange (PBX), or connected thereto.

In one embodiment, the compatibility of the terminals enables a user to work from a terminal that is arranged near him at home, while the apparent location of the user for any calling party is a terminal assigned to the user and located in the office.

US 5,889,845 discloses a device and a method for permitting a connected user a virtual presence in a company office and being essentially able to behave as if this user were physically present in the company office.

In one embodiment, a virtual presence server instructs the private branch exchange (PBX) to forward all calls automatically to the connected user. In accordance with this prior art, the connected user handles outgoing telephone calls, fax transmissions, data transmissions and E-mail and implements his Internet access as if said connected user were physically present in the



identifications (a plurality of switching offices also being possible). After the allocation of a line identification, the diversion of the telecommunications connection is then performed automatically in this public switching office. In relation to these line identifications, there is preferably not any need at all in this case for the existence of real terminal connections or even terminal equipment (telephones or fax machines).

In one alternative embodiment of the invention, for example, line identifications of "virtual terminal connections" are used such that a connection is successfully set up when such a virtual terminal connection is assigned a real second terminal connection to which the connection is diverted. However, if corresponding terminal equipment also exists in relation to the line identifications, then this equipment can also be used as normal company terminals when not occupied.

The line identifications available are preferably main lines such that the management of the method according to the invention can be performed in the public switching offices. However, if the teleworker is employed in a relatively large company, it is normal there for the line identifications or the corresponding terminals at the company workstations to be combined in a private branch exchange (PBX). A portion of the branch exchange lines can be reserved for call deflection. However, the data required for the deflection continue to be stored in the public switching office of the private branch exchange, since a diversion can then already be performed there, and a diverted telecommunications connection does not impose a load on the lines between the switching office and the private branch exchange. However, in order to ensure that a connection from another internal terminal of the branch exchange is also correctly diverted to a home terminal, the private branch exchange stores at least the information as to whether a line

identification is allocated in the course of the diverting method. If this is the case, calls internal to the branch exchange are automatically forwarded to the public switching office and deflected from there to the home terminal. Furthermore, an exchange of information between the public switching office and the private branch exchange is required to integrate branch exchange terminals in the method according to the invention.

For approximately 15 years, for example in the case of ISDN connections and of analog connections, it has been possible to find out the calling number of an interlocutor. In the case of ISDN connections, they are transmitted in the D-channel, in parallel with the useful data in the B-channel that are used for the communication. Information data that reproduce a line identification are evaluated and displayed by an appropriately designed telecommunications apparatus. Consequently, if while at work the teleworker calls a customer from his house, it will be possible for the latter to find out the private number of the teleworker. The customer would then be able to call the teleworker at home even in periods when the latter is not even working, and could disturb the latter in his leisure time.

Consequently, when a telecommunications connection is being set up from the second telecommunications terminal (that is to say, for example, from the home terminal of the teleworker) to a third telecommunications terminal (for example the telecommunications terminal of a customer), the information data including the line identification data are modified in such a way that, instead of the line identification of the second telecommunications terminal, they produce the first line identification obtained at the initiation (which then corresponds to the line identification of a company terminal). Consequently, it is fundamentally a company number, and not the private number, that is displayed during business telephone calls in the case of the method





allocated. However, it would also be conceivable to request one of the line identifications and/or also to deal preferably with persons with a higher entitlement status, that is to say, if appropriate, to transmit an already allocated line identification to the newly requesting, but more highly entitled teleworker. The corresponding information is then also transmitted simultaneously to the public switching office of the home terminal. If the company workstation is a component of a private branch exchange, it can be provided that a corresponding control signal is also transmitted to the private branch exchange.

It is frequently desired for the possibility of conducting private conversations from the home terminal still to exist even after the activation of the call deflection. It can therefore be provided that the modification of the information data can be suppressed for this call by dialing a specific code that is recognized by the public switching office of the home workstation. It is thereby possible to distinguish very easily in the public switching office of the home terminal whether a business or a private conversation is in the process of being conducted so that separate bills can be prepared.

It may also be desired for the option to be given to request call deflection from an arbitrary external terminal, and that the first line identification and the second terminal, to which the telecommunications connections are to be diverted, are not established until the request. This then permits, for example, telephone calls to be deflected to an arbitrary terminal at which a person can be reached temporarily (for example, to a hotel terminal during a business trip). There is also the option of diverting the connections to a cell phone.

In accordance with a further aspect of the invention, there is a system with the aid of which such a diverting method can be carried out. The essential

components of the system are a plurality of provided line identifications that are managed by a switching office connected to them. This switching office then includes a device for storing the required information that says whether and to which telecommunications terminal a telecommunications connection directed to one of the provided line identifications is to be diverted. Also provided in the switching office are the means required for diverting telecommunications connections such that the device carry out the diversion automatically if necessary.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention is to be explained in more detail below with the aid of the attached drawings in which:

Figure 1 shows a diagram of the telecommunications terminals and switching offices participating in the method according to the invention.

Figure 2 shows the diversion of telecommunications connections directed to a company line identification to the home workstation.

Figure 3 shows the design of telecommunications connections from the home workstation.

Figure 4 shows the response of the home terminal in the case of private and of business telephone calls.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The method according to the invention is preferably implemented by Central Office Exchange Service (CENTREX). This is a service packet in the public network that provides means for constructing a corporate network with branch exchange functions. Centrex provides the possibility of combining the first line identification A<sub>1</sub> obtained when making a request with the second telecommunications terminal A<sub>2</sub>, that is to say with the home terminal, logically in a network-

wide "Centrex group". Of course, the invention is not limited to Centrex, and may be implemented in any way recognized in the art.

In the example illustrated in figure 1, the line identifications of the company are a component of a private branch exchange PBX. Of these line identifications, the identifications  $A1_1$  to  $A1_N$  are provided for the diverting method, and the two other terminals  $A4$ ,  $A5$  are used, by contrast, for company workstations. As already mentioned, no real terminals need to exist in relation to the identifications  $A1_1$  to  $A1_N$  provided for the diverting method, they can just as well be "virtual" - at least in the case of a part thereof. The connection of this private branch exchange PBX to the telecommunications network  $N$  is performed via the public switching office  $VST1$  of the private branch exchange PBX. This public switching office  $VST1$  includes a storage device, denoted below as teleworker list  $L1$ , that permits rapid access to the data of the line identifications  $A1_1$  to  $A1_N$ . For each individual line identification, these data comprise at least the information as to whether this has already been allocated and to which terminal a connection is to be forwarded. Furthermore, it would also be possible to store a list of the persons that are authorized to participate in the diverting method, together with their access codes.

If one of the line identifications  $A1_1$  to  $A1_N$  is allocated, the associated information is also stored in a second teleworker list  $L2$  that is a component of the public switching office  $VST2$  of the corresponding home terminal  $A2$ .

A call deflection is activated by the teleworker inputting the prescribed access code from his home terminal  $A2$  and subsequently inputting a personal PIN number for his identification. This is recognized by the switching office  $VST1$  of the private branch

exchange PBX, and a free line identification (the line identification  $A1_1$  in the present example), is assigned to the home terminal  $A2$ , and the information is forwarded to the switching office VST2 of the home terminal  $A2$ . The call deflection can also be deactivated again in the same way. There is then the possibility, for example, of detecting the times of logging on and off, and thus also the working time of the teleworker. As already mentioned at the beginning, it can also be provided that some persons are preferably dealt with when requesting the diverting method, and carry out "prioritize login" (for example by inputting a special code). It can then be established that these persons are allocated a line identification in any case, it being possible in the extreme case to allocate an already occupied identification for this purpose.

Figure 2 shows the diversion according to the invention of telecommunications connections directed to the line identification  $A1_1$ . If, for example, a customer dials the number of the line identification  $A1_1$  on his external terminal  $A3$ , the connection is firstly set up as far as the public switching office VST1 of the private branch exchange PBX. On the basis of the information stored in the teleworker list  $L1$ , however, it is recognized in the public switching office VST1 that the call is to be deflected to the telecommunications terminal  $A2$ . The telecommunications connection is then diverted directly from there such that the lines between the public switching office VST1 and the private branch exchange PBX of the company are not loaded. Furthermore, this diversion is not visible to the telecommunications terminal  $A3$ , and so from his point of view the customer is calling the teleworker at a company workstation  $A1_1$ .

If the line identification  $A1_1$  is called from the terminal  $A4$ , which is likewise integrated in the private branch exchange PBX, it is normally sufficient

in private branch exchanges to dial an abbreviated direct dial number. Consequently, in order to permit a diversion to the home terminal A2 here, as well, at least the information as to whether a connection directed to the line identification A1<sub>1</sub> is to be diverted or not is stored in the private branch exchange PBX. When a request is made for call deflection, the corresponding information can be transmitted from the switching office VST1 to the private branch exchange PBX by means of QSIG (Q- (Reference Point) Signaling). If a deflection is desired, the connection is simply forwarded to the public switching office. Once again, a telecommunications connection directed to the line identification A1<sub>1</sub> is then recognized in the public switching office VST1 and is then diverted to the home terminal A2 in accordance with the stored information in the teleworker list L1. Here, as well, the deflection is not visible to the caller. Moreover, there also continues to be the possibility, of course, of reaching the teleworker at his home workstation A2 through his usual private number.

In the case of a diverted telecommunications connection, the calling subscriber is thus subject to charges for setting up the connection as far as the public switching office VST1, whereas the remainder of the communications link is charged to the teleworker (or the company thereof). It is also possible to select from the terminal A3 a line identification - for example, the identification A1<sub>N</sub> - that is a "virtual" terminal which is, however, not even allocated at this instant. In this case, this connection can be forwarded to a mailbox M, to a general company terminal or to the central terminal of the private branch exchange PBX.

Figure 3 illustrates the setting up of telecommunications connections originating from the home terminal A2 of the teleworker. If the latter dials the number of the terminal A3 (for example of a



there. Consequently, the line identifications  $A1_1$  to  $A1_N$  made available are preferably respectively main lines that can be managed entirely by the public switching office.

The invention also provides for the teleworker to be able to conduct private conversations from his home terminal A2 even after requesting call deflection. In this case, he firstly dials a special control code in order to suppress the modification of the information data temporarily for a call, and subsequently dials the desired call number. The private number of the terminal A2 and not the line identification  $A1_1$  then appears at the called terminal.

The response of the home terminal A2 and of the public switching office VST2 are illustrated once again schematically in figure 4. If the call deflection is not activated (up), the terminal A2 responds like a normal private telephone connection with the private subscriber profile TP1. This subscriber profile TP1 reports, for example, under which call number the terminal A2 can be reached, and whether the latter is availing itself of any sorts of additional services (call waiting, mailbox etc).

If the teleworker logs on for call deflection, the terminal A2 additionally receives the teleworker profile TP2. How the terminal A2 then actually responds depends on the incoming and outgoing telecommunications connections. If the connection that is directed to the line identification  $A1_1$  but is diverted arrives at the terminal A2, or if the teleworker dials a number after logging on for call deflection, the terminal A2 responds in accordance with the teleworker profile TP2 like the company line identification  $A1_1$ . In the case of incoming connections that come about through dialing of the private number or through inputting of the previously mentioned control code, the terminal A2 responds, however, like the usual residence telephone

in accordance with the normal subscriber profile TP1.

In accordance with a first embodiment, the teleworkers are entitled to participate in the diverting method from their home terminal A2. In this case, the identifications of the authorized home terminals can already be stored in the public switching office VST1 of the private branch exchange. However, it can be provided for reasons of flexibility that also the second terminal to which a telecommunications connection is to be diverted, is not determined until a request is being made. This can be performed, for example, by the teleworker dialing from the terminal to which the connections are to be diverted a special control code for activating the call deflection, subsequently dialing the number of the desired second terminal (which could also, however, possibly be recognized automatically), and dialing a personal PIN number for his identification. Then, for example, the information as to which persons are entitled to avail themselves of the diverting service would initially be stored in the teleworker list L1. During logon, the information can then be supplemented and a new entry be made to the switching office of the second terminal. It is therefore possible to switch into the system from an arbitrary public terminal. Furthermore, it would then also be possible to deflect the calls to a cell phone (for example a GSM phone).

Since the method according to the invention can be realized merely by supplementing the switching office technology, independence from the locations of the terminals is achieved. A change in location requires only a new entry in the teleworker lists, that is to say a low administrative outlay.



GR 99 P 2700

- 1 -

## Description

Method and system for diverting telecommunications connections

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The present invention relates to a method and a system for diverting telecommunications connections.

10 Providers of public telecommunications networks also offer a range of supplementary services in addition to the usual basic services - which are, as a rule, the setting up of telecommunications connections and the transmission of useful data for the communication. The present invention makes use of the service of call  
15 deflection that permits a user under various conditions to divert incoming connections to other terminals, for example to automatic spoken announcements, to an operator or to another terminal at which the user can temporarily be reached.

20

"Teleworkers", for example, also avail themselves of such call deflection. These are to be understood to include staff members of a company who, in addition to their company workstation, also work from home from  
25 time to time and are, in particular, to be contactable there by phone. An insurance agent is an example of such a teleworker. If the latter activates the call deflection, telephone calls arriving at his company workstation are deflected automatically to his home  
30 terminal.

However, insurance agents in particular carry out the majority or even their entire work from home (possibly also only on specific days of the week), and so they  
35 use their actual company terminal only seldom or never. Maintaining a plurality of such terminals that are, in addition, only seldom used constitutes, however, a cost factor not to be neglected.

It is therefore an object of the invention to specify a method for diverting telecommunications connections that permits a flexible participation of a large number of persons and in the case of which the available  
5 telecommunications terminals and lines are used effectively.

The object is achieved by means of a method that has the features of claim 1. According to the invention, a specific quantity of line identifications that are provided for the diverting method are made available initially in this case. During the initiation of the call deflection to a terminal (for example to the home terminal of a teleworker), an as yet unoccupied line identification of the line identifications made available is then allocated. It is possible in this way to avoid communications terminals that are used only insufficiently in a company, since the use of a single line identification by a plurality of persons (only one person a specific instant in each case, of course) (sharing) is permitted. Since the setting up of telecommunications connections is performed under computer control in the switching offices, the method is easy to accomplish by supplementing the control software.

Developments of the invention are the subject matter of the subclaims. The information required for the method (which line identifications are available and are not yet occupied, to which second terminal should a telecommunications connection directed to an allocated line identifications be diverted) is preferably stored in the public switching office belonging to these line identifications (a plurality of switching offices also being possible). After the allocation of a line identification, the diversion of the telecommunications connection is then performed automatically in this public switching office. In relation to these line

- 5 It would also be conceivable, for example, to use line identifications of "virtual terminal connections" such that a connection is successfully set up only when such a virtual terminal connection is assigned a real second terminal connection to which the connection is  
10 diverted. However, if corresponding terminal equipment also actually exists in relation to the line identifications, then this equipment can also be used as normal company terminals when not occupied.
- 15 The line identifications available are preferably main lines such that the management of the method according to the invention can be performed exclusively in the public switching offices. However, if the teleworker is employed in a relatively large company, it is normal  
20 there for the line identifications or the corresponding terminals at the company workstations to be combined in a private branch exchange (PBX). A portion of the branch exchange lines can then be reserved for call deflection. However, the data required for the  
25 deflection continue to be stored in the public switching office of the private branch exchange, since a diversion can then already be performed there, and a diverted telecommunications connection does not impose a load on the lines between the switching office and  
30 the private branch exchange. However, in order to ensure that a connection from another internal terminal of the branch exchange is also correctly diverted to a home terminal, the private branch exchange stores at least the information as to whether a line  
35 identification is allocated in the course of the diverting method. If this is the case, calls internal to the branch exchange are automatically forwarded to the public switching office and deflected from there to the home terminal. Furthermore, an exchange of

GR 99 P 2700

information between the public switching office and the private branch exchange is required to integrate branch exchange terminals in the method according to the invention.

5

It has been possible for approximately 15 years for example in the case of ISDN connections but also of analog connections, to find out the calling number of an interlocutor. In the case of ISDN connections, there are transmitted for this purpose in the D-channel, in parallel with the useful data in the B-channel that are used for the communication, information data that reproduce a line identification and are evaluated and displayed by an appropriately designed telecommunications apparatus. Consequently, if while at work the teleworker calls a customer from his house, it will be possible for the latter to find out the private number of the teleworker. The customer would then be able to call the teleworker at home even in periods when the latter is not even working, and could disturb the latter in his leisure time.

Consequently, when a telecommunications connection is being set up from the second telecommunications terminal (that is to say, for example, from the home terminal of the teleworker) to a third telecommunications terminal (for example the telecommunications terminal of a customer), the information data containing the line identification data are modified in such a way that instead of the line identification of the second telecommunications terminal they produce the first line identification obtained at the initiation (which then corresponds to the line identification of a company terminal). Consequently, it is fundamentally only a company number, and not the private number, that is displayed during business telephone calls in the case of the method according to the invention. From the point of view of the customer, the latter therefore calls his insurance representative at the latter's company

GR 99 P 2700

workstation and/or is called up from the  
representative's company workstation. It is possible to  
ensure in this way in conformity with labor law that  
the teleworker cannot be disturbed during his leisure  
5 time, since business telephone calls are deflected to  
him at home only when he has requested the call  
deflection. The data required for this purpose (first  
line identification and home terminal) are stored in  
the public switching office of the home terminal and  
10 when a connection is being set up the information data  
are also already modified there. Since it is impossible  
to rule out that different company line identifications  
can be allocated in each case for a teleworker when  
there is a repeated request for call deflection, it can  
15 be provided that the information data containing the  
line identification data are modified in such a way  
that they reproduce only a general company  
identification (for example, the identification of the  
private branch exchange).

20 It is also possible to provide in the case of the use  
of branch exchange terminals that the control software  
of the public switching office of the home terminal  
recognizes the call number internal to the branch  
25 exchange and automatically sets up a connection to the  
private branch exchange, the information data being  
modified once. As a result of this, it is not apparent  
even for a telecommunications terminal inside the  
private branch exchange whether the teleworker is  
30 located at a company workstation or at his home  
workstation.

In accordance with an advantageous development, the  
call deflection can be activated in a simple way from  
35 the home workstation, specifically by setting up a  
telecommunications connection to the public switching  
office of the line identifications made available, and  
transmitting a suitable control signal, for example by  
inputting a special code and/or a PIN number. A line  
40 identification that is still free is then automatically

15 It is frequently desired for the possibility of  
conducting private conversations from the home terminal  
still to exist even after the activation of the call  
deflection. It can therefore be provided that the  
modification of the information data can be suppressed  
20 for this call by dialing a specific code that is  
recognized by the public switching office of the home  
workstation. It is thereby possible to distinguish very  
easily in the public switching office of the home  
terminal whether a business or a private conversation  
25 is in the process of being conducted so that separate  
bills can be prepared.

40 In accordance with a further aspect of the invention,

GR 99 P 2700

the independent claim 11 proposes a system with the aid of which such a diverting method can be carried out. The essential components of the system are a plurality of provided line identifications that are managed by a switching office connected to them. This switching office then includes means for storing the required information that says whether and to which telecommunications terminal a telecommunications connection directed to one of the provided line identifications is to be diverted. Also provided in the switching office are the means required for diverting telecommunications connections such that said means carry out the diversion automatically if necessary.

The invention is to be explained in more detail below with the aid of the attached drawing, in which

Figure 1 shows a diagram of the telecommunications terminals and switching offices participating in the method according to the invention;

Figure 2 shows the diversion of telecommunications connections directed to a company line identification to the home workstation;

Figure 3 shows the design of telecommunications connections from the home workstation; and

Figure 4 shows the response of the home terminal in the case of private and of business telephone calls.

The method according to the invention is preferably implemented by means of Centrex (Central Office Exchange Service). This is a service packet in the public network that provides means for constructing a corporate network with branch exchange functions. Centrex provides the possibility of combining the first line identification  $A1_1$  obtained when making a request

GR 99 P 2700

with the second telecommunications terminal A2, that is to say with the home terminal, logically in a network-wide "Centrex group".

5 In the example illustrated in figure 1, all the line identifications of the company are a component of a private branch exchange PBX. Of these line identifications, the identifications  $A1_1$  to  $A1_N$  are provided for the diverting method, and the two other  
10 terminals A4, A5 are used, by contrast, only for company workstations. As already mentioned, no real terminals need necessarily exist in relation to the identifications  $A1_1$  to  $A1_N$  provided for the diverting method, they can just as well be "virtual" - at least  
15 in the case of a part thereof. The connection of this private branch exchange PBX to the telecommunications network N is performed via the public switching office VST1 of the private branch exchange PBX. This public switching office VST1 includes a storage device,  
20 denoted below as teleworker list L1, that permits rapid access to the data of the line identifications  $A1_1$  to  $A1_N$ . For each individual line identification, these data comprise at least the information as to whether this has already been allocated and to which terminal a  
25 connection is to be forwarded. Furthermore, it would also be possible to store a list of the persons that are authorized to participate in the diverting method, together with their access codes.

30 If one of the line identifications  $A1_1$  to  $A1_N$  is allocated, the associated information is also stored in a second teleworker list L2 that is a component of the public switching office VST2 of the corresponding home terminal A2.

35

A call deflection is activated by the teleworker inputting the prescribed access code from his home terminal A2 and subsequently inputting a personal PIN





GR 99 P 2700

If the line identification  $Al_1$  is called from the terminal A4, which is likewise integrated in the private branch exchange PBX, it is normally sufficient in private branch exchanges to dial only an abbreviated direct dial number. Consequently, in order to permit a diversion to the home terminal A2 here, as well, at least the information as to whether a connection directed to the line identification  $Al_1$  is to be diverted or not is stored in the private branch exchange PBX. When a request is made for call deflection, the corresponding information can be transmitted from the switching office VST1 to the private branch exchange PBX by means of QSIG (Q- (Reference Point) Signaling). If a deflection is desired, the connection is simply forwarded to the public switching office. Once again, a telecommunications connection directed to the line identification  $Al_1$  is then recognized in the public switching office VST1 and is then diverted to the home terminal A2 in accordance with the stored information in the teleworker list L1. Here, as well, the deflection is not visible to the caller. Moreover, there also continues to be the possibility, of course, of reaching the teleworker at his home workstation A2 through his usual private number.

It can be provided for the case of a diverted telecommunications connection that the calling subscriber is subject to charges only for setting up the connection as far as the public switching office VST1, whereas the remainder of the communications link is charged to the teleworker (or the company thereof). It would also be conceivable to select from the terminal A3 a line identification - for example, the identification  $Al_N$  - that is a "virtual" terminal which is, however, not even allocated at this instant. In this case, this connection can be forwarded to a

GR 99 P 2700

mailbox M, to a general company terminal or to the central terminal of the private branch exchange PBX.

Figure 3 illustrates the setting up of telecommunications connections originating from the home terminal A2 of the teleworker. If the latter dials the number of the terminal A3 (for example of a customer), the telecommunications connection is set up in a known way via the public switching office VST2 of the home terminal A2 and the telecommunications network N to the external terminal A3. In addition, however, on the basis of the information stored in the teleworker list L2 of the public switching office VST2, the information data transmitted in parallel is now modified. If the customer at the terminal A3 is capable of identifying the interlocater on the basis of the information data, it is not the number of the home terminal A2, but the number of the line identification A1<sub>1</sub> obtained when the request was made that appears in his display. From the point of view of the terminal A3, it is the company terminal with the identification A1<sub>1</sub> that is the origin of the telecommunications connection. This prevents the customer from finding out the private number of the teleworker and possibly calling up the latter during his leisure time. Since, however, a teleworker can be allocated various line identifications in the case of repeated requests, it can be established alternatively that the modified information data display only the general number of the private branch exchange PBX or a central company number but not the concrete identification A1<sub>1</sub>.

If the teleworker would like to call from his home terminal A2 to a colleague at the latter's company workstation A4, it is also sufficient at his home terminal A2 to dial only the direct call number internal to the branch exchange. This is recognized by the public switching office VST2, and the

GR 99 P 2700

telecommunications connection is forwarded automatically via the public switching office VST1 to the private branch exchange PBX, and from there to the extension A4.

5

If the line identifications are made available inside a private branch exchange, it is necessary for exchange of data and information to be possible between the private branch exchange and the public switching office if the call deflection is to be performed as early as there. Consequently, the line identifications  $A1_1$  to  $A1_N$  made available are preferably respectively main lines that can be managed entirely by the public switching office.

10

15

It can be provided for the teleworker also to be able to conduct private conversations from his home terminal A2 even after requesting call deflection. In this case, he firstly dials a special control code in order to suppress the modification of the information data temporarily for a call, and subsequently dials the desired call number. The private number of the terminal A2 and not the line identification  $A1_1$  then appears at the called terminal.

20

25

The response of the home terminal A2 and of the public switching office VST2 are illustrated once again schematically in figure 4. If the call deflection is not activated (up), the terminal A2 responds like a normal private telephone connection with the private subscriber profile TP1. This subscriber profile TP1 reports, for example, under which call number the terminal A2 can be reached, and whether the latter is availing itself of any sorts of additional services (call waiting, mailbox etc).

30

35

If the teleworker logs on for call deflection, the terminal A2 additionally receives the teleworker

GR 99 P 2700

profile TP2. How the terminal A2 then actually responds depends on the incoming and outgoing telecommunications connections. If the connection that is directed to the line identification A1<sub>1</sub> but is diverted arrives at the terminal A2, or if the teleworker dials a number after logging on for call deflection, the terminal A2 responds in accordance with the teleworker profile TP2 like the company line identification A1<sub>1</sub>. In the case of incoming connections that come about through dialing of the private number or through inputting of the previously mentioned control code, the terminal A2 responds, however, like the usual residence telephone in accordance with the normal subscriber profile TP1.

15 In accordance with a first embodiment, the teleworkers are entitled to participate in the diverting method only from their home terminal A2. In this case, the identifications of the authorized home terminals can already be stored in the public switching office VST1 of the private branch exchange. However, it can be provided for reasons of flexibility that also the second terminal to which a telecommunications connection is to be diverted, is not determined until a request is being made. This can be performed, for example, by the teleworker dialing from the terminal to which the connections are to be diverted a special control code for activating the call deflection, subsequently dialing the number of the desired second terminal (which could also, however, possibly be recognized automatically), and dialing a personal PIN number for his identification. Then, for example, only the information as to which persons are entitled to avail themselves of the diverting service would initially be stored in the teleworker list L1. Only during logon can the information then be supplemented and a new entry be made to the switching office of the second terminal. It is therefore possible to switch into the system from an arbitrary public terminal.

GR 99 P 2700

Furthermore, it would then also be possible to deflect the calls to a cell phone (for example a GSM phone).

5 Since the method according to the invention can be realized merely by supplementing the switching office technology, independence from the locations of the terminals is achieved. A change in location requires only a new entry in the teleworker lists, that is to say only a low administrative outlay.

10

# Patent claims

1. A method for diverting telecommunications connections that has the following steps:  
15 providing a prescribed number of line identifications ( $A_{11} - A_{1N}$ );  
request from a telecommunications terminal (A2) to participate in the diverting method with the allocation  
20 of one of the line identifications ( $A_{11} - A_{1N}$ ); and  
diverting telecommunications connections directed to the allocated line identification ( $A_{11}$ ) to the telecommunications terminal (A2).

25 2. The method as claimed in claim 1, characterized in that the line identifications ( $A_{11} - A_{1N}$ ) provided for the diverting method are extension numbers of a common private branch exchange (PBX).

30 3. The method as claimed in claim 1 or 2, characterized in that in a public switching office (VST1) of the plurality of line identifications ( $A_{11} - A_{1N}$ ) and/or the private branch exchange (PBX) information is stored that says whether and to which  
35 telecommunications terminal (A2) a telecommunications connection directed to one of the provided line identifications ( $A_{11} - A_{1N}$ ) is to be diverted, a diversion to this public switching office (VST1) being

GR 99 P 2700

performed.

4. The method as claimed in one of the preceding claims, characterized in that the allocated line  
5 identification ( $A1_1$ ) and the identification of the telecommunications terminal (A2) are stored in a public switching office (VST2) of the telecommunications terminal (A2) at the beginning of the method, transmitted in parallel with the useful signal is an  
10 information signal that contains data that reproduce a line identification, and the information signal is modified when setting up a telecommunications connection from the telecommunications terminal (A2) to a further  
15 telecommunications terminal (A3).

5. The method as claimed in claim 4, characterized in that the information signal is modified in such a way that it reproduces the line identification ( $A1_1$ )  
20 allocated in the course of the diversion.

6. The method as claimed in claims 2 and 4, characterized in that the information signal is modified in such a way that it reproduces the line  
25 identification of the private branch exchange (PBX).

7. The method as claimed in one of claims 4 to 6, characterized in that the modification of the information data can be switched off temporarily by  
30 inputting a special control signal.

8. The method as claimed in one of the preceding claims, characterized in that said method is initiated from the telecommunications terminal (A2) by inputting  
35 a prescribed access code.

9. The method as claimed in one of the preceding claims, characterized in that the telecommunications

GR 99 P 2700

terminals from which it is possible to participate in the diverting method are prescribed, and their identifications are stored in the public switching offices (VST1) of the provided line identifications  
 5 (A1<sub>1</sub> - A1<sub>N</sub>) and/or the private branch exchange (PBX).

10. The method as claimed in one of claims 1 to 8, characterized in that a request can be made by transmitting a control signal from an arbitrary  
 10 terminal (A2) to which the telecommunications connections are diverted.

11. A system for diverting telecommunications connections, having:  
 15 a switching office (VST1) that is connected to a plurality of line identifications (A1<sub>1</sub> - A1<sub>N</sub>) provided for the diverting method and has means (L1) for storing information that says whether and to which telecommunications terminal (A2) a telecommunications  
 20 connection directed to one of the provided line identifications (A1<sub>1</sub> - A1<sub>N</sub>) is to be diverted, as well as means for diverting telecommunications connections; telecommunications connections that are directed to the line identification (A1<sub>1</sub>) allocated during the request  
 25 being diverted automatically from the switching office (VST1) to the telecommunications terminal (A2).

12. The system as claimed in claim 11, characterized in that the switching office is a public switching  
 30 office (VST1).

13. The system as claimed in claim 12, characterized in that it additionally includes a private branch exchange (PBX) that manages the provided line  
 35 identifications (A1<sub>1</sub> - A1<sub>N</sub>), the private branch exchange (PBX) having means for storing information that says whether a telecommunications connections directed to a provided line identification (A1<sub>1</sub> - A1<sub>N</sub>) is to be



GR 99 P 2700

diverted.

14. The system as claimed in one of claims 11 to 13,  
characterized in that it has a second switching office  
5 (VST2) that is connected to the second  
telecommunications terminal (A2) and includes means  
(L2) for storing the line identification of the second  
telecommunications terminal (A2) and the line  
identification (A1<sub>1</sub>) allocated to this second  
10 telecommunications terminal (A2), as well as means for  
modifying information data that reproduce a line  
identification.

# Abstract

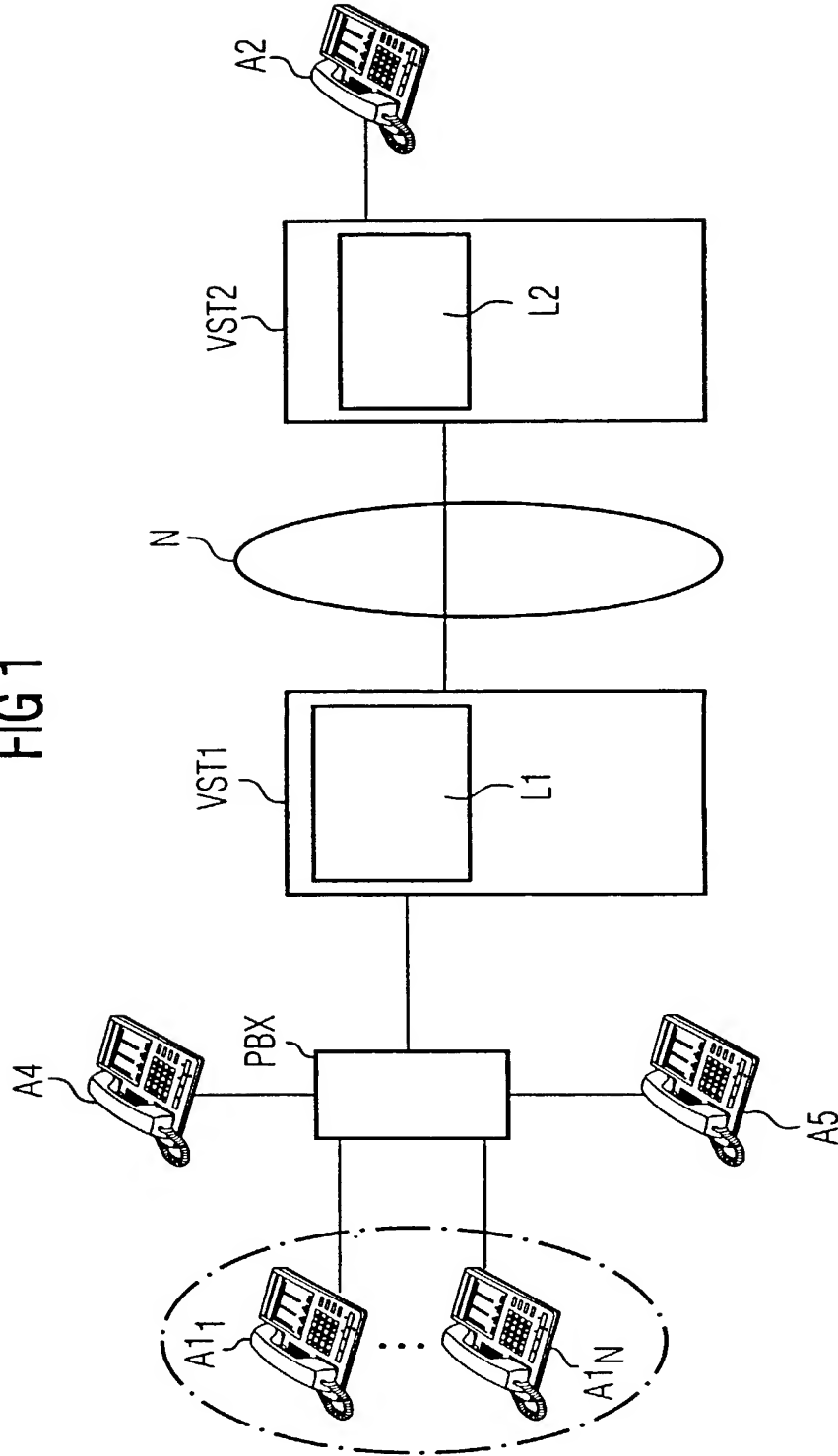
Method and system for diverting telecommunications connections

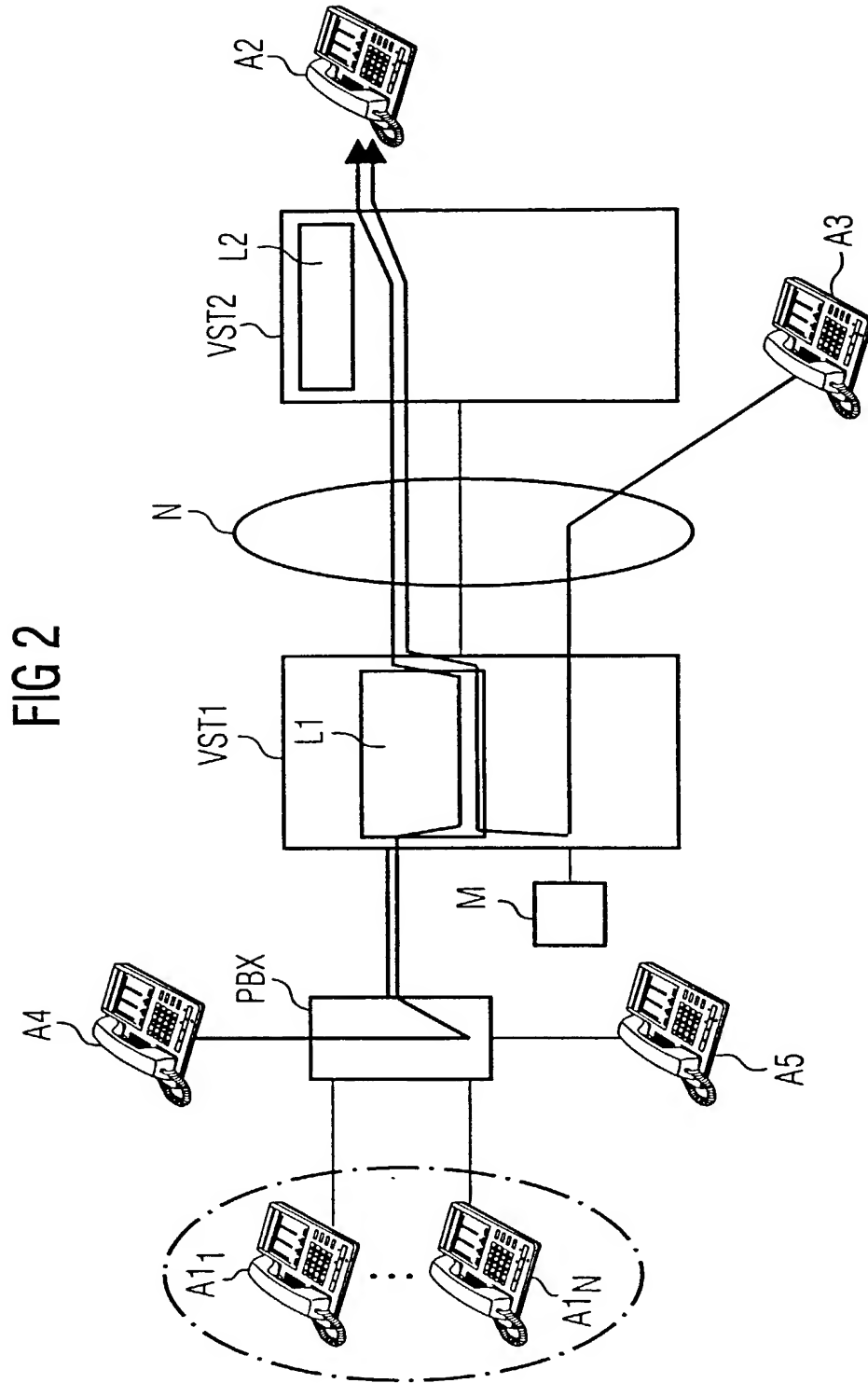
In the case of a method for diverting telecommunications connections, a prescribed number of line identifications ( $A_{1_1} - A_{1_N}$ ) are first made available. Upon request to participate in the diverting method, a line identification ( $A_{1_1} - A_{1_N}$ ) that is still free is allocated, all telecommunications connections directed to this line identification ( $A_{1_1}$ ) subsequently being diverted to a telecommunications terminal ( $A_2$ ).

Figure 3

1/4

FIG 1





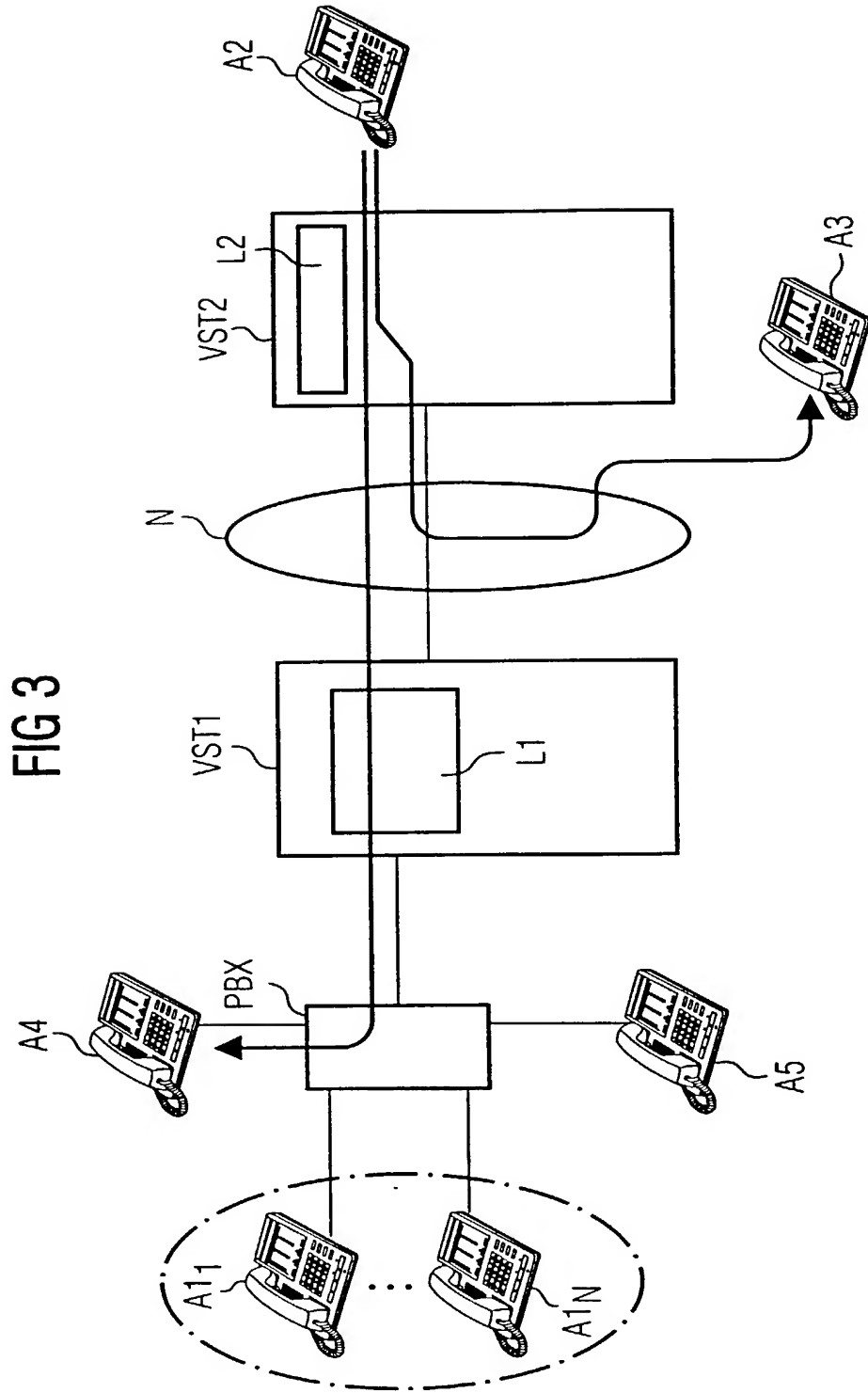
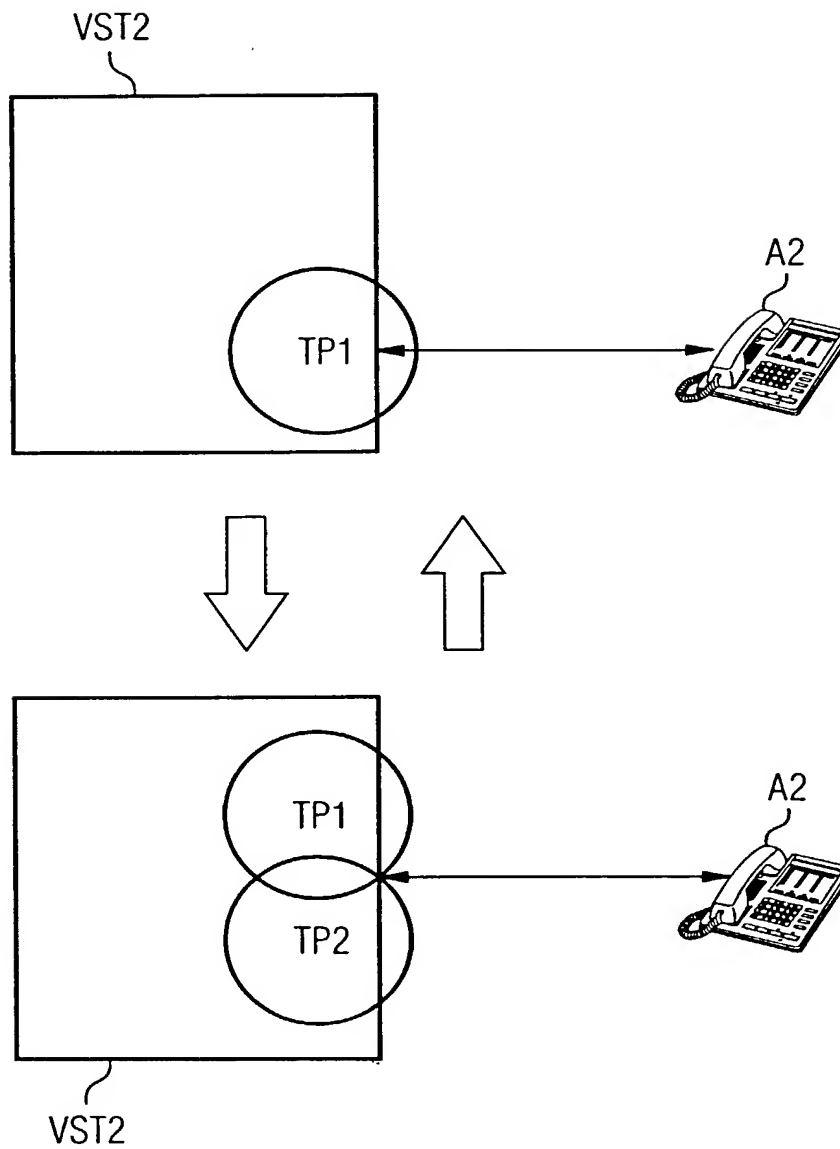


FIG 4



# Declaration and Power of Attorney For Patent Application

## Erklärung Für Patentanmeldungen Mit Vollmacht

### German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

#### Verfahren und System zum Umlenken von Fernmeldeverbindungen

#### Method and system for diverting telecommunications connections

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)

(check one)

☐ hier beigefügt ist.

☐ is attached hereto.

☒ am 28.08.2000 als

☒ was filed on 28.08.2000 as

PCT internationale Anmeldung

PCT international application

PCT Anmeldungsnummer PCT/DE00/02939

PCT Application No PCT/DE00/02939

eingereicht wurde und am 26.02.2002

and was amended on 26.02.2002

abgeändert wurde (falls tatsächlich abgeändert)

(if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1 56(a)

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed

## German Language Declaration

Prior foreign applications  
Priorität beansprucht

Priority Claimed

19941152.2  
(Number)  
(Nummer)

DE  
(Country)  
(Land)

30.08.1999  
(Day Month Year Filed)  
(Tag Monat Jahr eingereicht)

☒ ☐  
Yes No  
Ja Nein

(Number) (Country)  
(Nummer) (Land)

(Day Month Year Filed)  
(Tag Monat Jahr eingereicht)

☐ ☐  
Yes No  
Ja Nein

(Number) (Country)  
(Nummer) (Land)

(Day Month Year Filed)  
(Tag Monat Jahr eingereicht)

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Yes No  
Ja Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

PCT/DE00/02939  
(Application Serial No.)  
(Anmeldeseriennummer)

28.08.2000  
(Filing Date D, M, Y)  
(Anmeldedatum T, M, J)

anhängig  
(Status)  
(patentiert, anhängig,  
aufgegeben)

pending  
(Status)  
(patented, pending,  
abandoned)

(Application Serial No.)  
(Anmeldeseriennummer)

(Filing Date D,M,Y)  
(Anmeldedatum T, M, J)

(Status)  
(patentiert, anhängig,  
aufgeben)

(Status)  
(patented, pending,  
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Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden können, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patenten gefährden können.

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Telefongespräche bitte richten an  
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Ext. \_\_\_\_\_

Postanschrift

Send Correspondence to.

Morrison and Foerster LLP  
2000 Pennsylvania Ave., NW 20006-1888 Washington, DC  
Telephone: (001) 202 887 1500 and Facsimile (001) 202 887 0763

or  
**Customer No. 25227**

Voller Name des einzigen oder ursprünglichen Erfinders:		Full name of sole or first inventor.	
<u>Sigrid Hertelt</u>		Sigrid Hertelt	
Unterschrift des Erfinders	Datum	Inventor's signature	Date
<u>Sigrid Hertelt</u>	<u>4/3.02</u>		
Wohnsitz		Residence	
<u>Muenchen, DEUTSCHLAND</u>		<u>Muenchen, GERMANY</u>	
Staatsangehörigkeit		Citizenship	
<u>DE</u>		<u>DE</u>	
Postanschrift		Post Office Address	
<u>Stephan-Lochner-Str.9</u>		<u>Stephan-Lochner-Str.9</u>	
<u>80686 Muenchen</u>		<u>80686 Muenchen</u>	
Voller Name des zweiten Miterfinders (falls zutreffend):		Full name of second joint inventor, if any:	
<u>Udo Klotz</u>		Udo Klotz	
Unterschrift des Erfinders	Datum	Second Inventor's signature	Date
<u>Udo Klotz</u>	<u>28.2.02</u>		
Wohnsitz		Residence	
<u>Neuried, DEUTSCHLAND</u>		<u>Neuried, GERMANY</u>	
Staatsangehörigkeit		Citizenship	
<u>DE</u>		<u>DE</u>	
Postanschrift		Post Office Address	
<u>Buchendorfer Str.24</u>		<u>Buchendorfer Str.24</u>	
<u>82061 Neuried</u>		<u>82061 Neuried</u>	

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben)

(Supply similar information and signature for third and subsequent joint inventors).

Voller Name des dritten Miterfinders: <u>Bernhard Krembs</u>		Full name of third joint inventor <u>Bernhard Krembs</u>	
Unterschrift des Erfinders <u>Bernhard Krembs</u>	Datum <u>28.2.02</u>	Inventor's signature	Date
Wohnsitz <u>Gruenwald, DEUTSCHLAND</u> <u>DEX</u>		Residence <u>Gruenwald, GERMANY</u>	
Staatsangehörigkeit <u>DE</u>		Citizenship <u>DE</u>	
Postanschrift <u>Mechtildenstr. 11a</u>		Post Office Address <u>Mechtildenstr. 11a</u>	
<u>82031 Gruenwald</u>		<u>82031 Gruenwald</u>	
Voller Name des vierten Miterfinders: <u>Dr. Irena Romanski</u>		Full name of fourth joint inventor <u>Dr. Irena Romanski</u>	
Unterschrift des Erfinders <u>Irena Romanski</u>	Datum <u>6.3.02</u>	Inventor's signature	Date
Wohnsitz <u>Egling, DEUTSCHLAND</u> <u>DEX</u>		Residence <u>Egling, GERMANY</u>	
Staatsangehörigkeit <u>DE</u>		Citizenship <u>DE</u>	
Postanschrift <u>Mooshamer Str. 5b</u>		Post Office Address <u>Mooshamer Str. 5b</u>	
<u>82544 Egling</u>		<u>82544 Egling</u>	
Voller Name des funften Miterfinders: <u>Karl Schurr</u>		Full name of fifth joint inventor <u>Karl Schurr</u>	
Unterschrift des Erfinders <u>Karl Schurr</u>	Datum <u>4.3.2002</u>	Inventor's signature	Date
Wohnsitz <u>Alling, DEUTSCHLAND</u> <u>DEX</u>		Residence <u>Alling, GERMANY</u>	
Staatsangehörigkeit <u>DE</u>		Citizenship <u>DE</u>	
Postanschrift <u>Feldhuterstrasse 2</u>		Post Office Address <u>Feldhuterstrasse 2</u>	
<u>82239 Alling</u>		<u>82239 Alling</u>	
Voller Name des sechsten Miterfinders:		Full name of sixth joint inventor	
Unterschrift des Erfinders	Datum	Inventor's signature	Date
Wohnsitz		Residence	
Staatsangehörigkeit		Citizenship	
Postanschrift		Post Office Address	

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